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Fertilizer Suggestions for Idaho Farmers

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EXTENSION SERVICE IN AGRICULTURE AND HOME ECONOMICS OF THE STATE OF IDAHO, UNIVERSITY OF IDAHO, COLLEGE OF AGRICULTURE AND UNITED STATES DEPARTMENT OF AGRICULTURE, COOPERATING

SOILS SECTION

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Summary

IDAHO has entered the first stage in the use of commercial fertilizers.

Phosphorus has produced profitable increases in crops over a large part of the irrigated areas.

Soil nitrogen should be maintained principally through the use of legumes. The application of nitrogen fertilizers may prove desirable under specialized conditions.

The need of potash is much more limited than that of phosphorus. Potash should be used in combination with phosphorus to secure best results.

Fertilizers never will become a substitute for good farming methods. It is necessary to use the same care in preparation of seed bed, irrigation, and cultivation and tillage where fertilizers are used as where no fertilizers are needed.

Fertilizers do not control insect pests or plant diseases. However, vigorous, fast-growing plants resulting from favorable soil and food conditions have a much better chance of surviving attacks of insects and disease.

The need of fertilizers should be determined by tests and field trials before purchasing.

Fertilizers should be used as a supplement to the existing means of maintaining fertility.

Fertilizer Suggestions for Idaho Farmers

by

G. R. McDole*

THE SUCCESSFUL growing of crops involves a complex set of relations between the plant and its environment. Some of the factors, such as temperature, amount of sunshine, length of growing season, and rain are beyond the farmer's control. Some of the other factors influencing plant growth are within control. Moisture can be controlled under irrigation. The physical condition of the soil may be affected or controlled by the use of rotations and proper tillage methods.

In addition to the factors which affect the environment of the plant it is necessary to provide sufficient food to produce a satisfactory growth. Fertilizers provide a means of supplying additional plant food.

The history of the development of the fertilizer industry is linked up with the agricultural development of the country. The newer lands contained sufficient plant food to maintain satisfactory crops for a number of years. The continual removal of plant food in the form of plant and animal products gradually depleted the virgin fertility until a reduction in yield has become evident. The older agricultural areas have passed through this transition period of soil depletion and farmers in those regions now consider as essential the addition of plant food in the form of fertilizers.

The irrigated areas of the West have been renowned for the heavy yields of various crops. These have resulted in the removal of larger amounts of plant food each year than has taken place in the humid regions. The initial supply of some form of plant food was greater in soils of the arid West than in the virgin soils of the humid regions. Western soils are so rich naturally that many have believed they would never need fertilization.

The history of the irrigated areas has shown that a marked reduction in yield has taken place in the older projects. The addition of fertilizers in recent years has increased the yield of various crops sufficiently to make the use of fertilizers attractive.

The Idaho Experiment Station recognizes the fact that some soils in the State are depleted in plant food and that the judicious use of fertilizers is a profitable investment. To assist Idaho farmers with specific fertility problems, this Bulletin has been compiled to meet inquiries received on the subject.

1. *What are fertilizers?*

Fertilizers are materials containing elements needed by plants. Fertilizers are defined by plant physiologists as material contain-

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ing nutrient elements. For the purpose of this Bulletin nutrient elements will be called plant food. Stated in simple language fertilizers are materials which, when placed in the soil become available as plant food.

2. *What were the first materials used as fertilizers?*

The first materials used as fertilizers consisted of animal manures and plant residues. Phosphorus was the first element prepared as a chemical fertilizer. The manufacture of phosphates laid the foundation for the present commercial fertilizer industry.

3. *What does the term commercial fertilizer mean?*

The term commercial fertilizer is applied to any form of plant food not obtained from animal manures or crop residues. The materials used in making commercial fertilizers may vary from rather pure chemicals to the by-products of such industries as meat packing and fish canning. The commercial fertilizers contain definite percentages of nitrogen, phosphorus, and potash.

4. *What is a fertilizer formula?*

A fertilizer formula represents the percentage of plant food elements contained in the fertilizer. For instance, the formula 4-8-4 indicates 4 per cent nitrogen, 8 per cent phosphoric acid, and 4 per cent potash. The percentages are indicated in the following order: nitrogen, phosphorus, potash.

5. *Of what value is the formula to the purchaser of fertilizers?*

The formula permits of a direct comparison of the value of different fertilizers. It enables the purchaser to choose a fertilizer best suited to his conditions, and to intelligently feed his crops.

6. *How does the plant food in commercial fertilizers compare with that in barnyard manure?*

The plant food in barnyard manure is combined with organic matter, part of which must undergo decomposition before becoming available to the plant. In the process of decomposition some of the plant food is lost and some requires a long period of time before becoming available.

The plant food in commercial fertilizers consists of two types; that which is slowly available and that which is readily available. The greater part of the plant food contained in commercial fertillizers consists of the readily available type. In some fertilizer formulae, part of the content of one or more elements may be derived from the slowly available forms and part from the more readily available forms. This is often done to improve the physical condition of the mixture, to utilize by-products of manufacturing processes, and to provide an available supply to the plant during the later portion of the growing season.

Ordinarily a greater part of the commercial fertilizer is used by the plant the year it is applied. The residual effects of farm

manures are often noticed after the effect of commercial fertilizers has disappeared. Commercial fertilizers are very concentrated compared to manure, requiring less per acre. Manure contains organic matter which has a beneficial effect upon the physical condition of the soil.

7. *How much plant food is contained in a ton of barnyard manure?*

The composition of farm manures varies according to the animal and the feed. Mixed farm manure obtained principally from horses and cattle usually is found to contain about 10 to 12 pounds of nitrogen, 5 to 6 pounds of phosphorus, and 10 to 12 pounds of potash per ton of wet product.

8. *Is commercial fertilizer as good as barnyard manure?*

The crop and conditions determine the type of fertilization. If the soil is low in organic matter barnyard manure is the more desirable form of fertilizer. It is possible to balance the plant food in the soil through the use of commercial fertilizers better than with manure. The use of commercial fertilizers has increased as supplies of manure have decreased. The best policy is to use both forms of fertilization instead of regarding one as a substitute for the other.

9. *What is meant by reinforcing barnyard manure?*

Adding one or more elements to increase its content is termed reinforcing. Phosphorus being the most deficient is the element usually added. Under some conditions potash also is added.

10. *Are commercial fertilizers stimulants?*

Adding fertilizer to the soil should be compared to the giving of feed to animals. If a small amount of readily available fertilizer is added to a soil an increase in growth may result which will not continue for the entire season if this fertilizer is inadequate to meet the needs of the crop. This has caused some to regard commercial fertilizers as stimulants when they should be regarded as supplies of available plant food.

11. *Will one have to continue to use commercial fertilizers after starting to use them?*

The plant must be fed if it is to produce a profitable yield. If sufficient plant food can be obtained by other means it will not be necessary to continue the use of commercial fertilizers. The problem becomes one in which the farmer is called upon to decide upon the most profitable method of providing food for the plant.

12. *What materials are used in making commercial fertilizers?*

It would take too long to give the entire list of materials containing nitrogen, phosphorus, or potash and used in making fertilizers. The greatest variety of materials is found in those containing nitrogen. The following are used at different times: ammonium sulphate, sodium nitrate, calcium cyanamid, ammo-

nium phosphate, tankage, fish meal, and a large number of factory by-products. Phosphorus usually is supplied as super phosphate and the potash either as the chloride or sulphate.

13. *What does the term high-analysis mean when applied to commercial fertilizers?*

The term high-analysis, or a high-analysis formula designates the difference between fertilizers containing a relatively small amount of plant food and those containing sufficient to recommend their use. The dividing line is more or less arbitrary and varies in different states, usually falling between 14 and 20 units of plant food. In determining whether a fertilizer is in one class or the other the percentages of all plant food elements are added together. If the total is greater than the lower limit set for high-analysis it falls in that class and if not it falls in the low analysis class. For example, a formula 2-4-2 would contain only 8 units of plant food and would fall in the low analysis class while one having a formula 10-20-10 with 40 units would definitely come in the high-analysis class.

14. *Which type of fertilizer is best to use, high or low analysis?*

High-analysis fertilizers provide the cheapest source of plant food. The cost of sacks, freight and labor is reduced. In most trials equal or better results have been obtained with the high-analysis fertilizers. In purchasing fertilizers the cost per acre should determine the fertilizer to use rather than the cost per ton.

15. *Is there any danger in the use of high-analysis fertilziers?*

If high-analysis fertilizers are applied at heavy rates in direct contact with the seed a reduction in stand will result. A lighter application may eliminate the trouble, but the better way is to use fertilizer distributers that separate the seed from the fertilizer or work the fertilizer into the soil before seeding.

16. *How should fertilizers be applied to secure best results from various crops?*

To answer this question fully it would be necessary to discuss each crop separately, which would require too much space. There are two general ways of distributing fertilizer: broadcast, and in the row. Broadcasting is the safest and is entirely satisfactory for such crops as hay and grain. The fertilizer may be applied either before seeding, working it into the soil in the preparation of the seed bed; or at the time of seeding, using a fertilizer attachment on the drill. Row crops are best fertilized by applying the fertilizer in a thin stream on either side of the seed. The fertilizer should not be in contact with the seed after covering. With row crops a desirable effect will be obtained with less fertilizer if applied in the row. Where fertilizers are used it is desirable to have planters and drills equipped with distributors.

17. *How long will the effect of commercial fertilizers last?*

So many factors influence the length of time the residual effect of fertilizers remains in the soil that it varies on different farms. Fertilizer practices are governed by the cost of fertilizer and the price received for farm products. The heaviest fertilization should be applied to the most valuable crop in the rotation. In some cases an application of fertilizer every second or third year is sufficient, while in others a lighter application every year is more profitable.

18. *What is the meaning of the terms "straight goods" and "mixed goods"?*

"Straight goods" is a term applied to fertilizers containing only one fertilizer element. For instance, ammonium sulphate contains only introgen; super phosphate contains only phosphorus; and potassium sulphate contains only potash. If two or more materials are mixed together to produce a fertilizer containing two or all three of these elements, the product is called "mixed goods," or a "complete fertilizer" where all three elements are present.

19. *Why is filler used?*

Filler is a term applied to materials containing little or none of the three elements indicated in the fertilizer formula. Filler is used to improve the physical condition of the fertilizer and to bring the weight to even tons. The chief value of filler lies in keeping mixed fertilizers in proper physical condition. Some materials tend to cake or harden upon standing. Mixing with the right kind of filler insures the fertilizer being in proper condition to apply.

In some cases the manufacturers add materials claimed to increase the value of the fertilizer above that of the nitrogen, phosphorus, and potash they contain. Such statements often are unwarranted.

20. *What are home mixed goods?*

Straight goods purchased and brought to the farm for mixing have given rise to the term "home mixed goods."

21. *Is home mixing desirable?*

The chief reason for home mixing lies in being able to purchase simples and mix them cheaper than the same plant food can be purchased in the mixed form. In some cases the farmer can save sufficient to make it desirable for him to mix his own fertilizers, while in other cases the difference in price is not sufficient to pay for the extra labor.

22. *What is the advantage in purchasing ready mixed fertilizers?*

In purchasing mixed goods the responsibility of the analysis and the physical condition of the fertilizer is placed on the manufacturer. The fertilizer laws protect the purchaser in the analysis

and the manufacturer must put the goods in good physical condition if he expects them to sell. Price has been the chief factor in causing the farmers to mix their own fertilizers.

23. *How can the farmers learn to mix their own fertilizers?*

The percentage of plant food elements is marked on the package making it simply a matter of arithmetic in determining the amount of each material needed to obtain the desired product. *Example*: A fertilizer having a forula 2-12-2 is to be made from the following materials: amonium sulfate containing 18 per cent nitrogen, super phosphate containing 16 per cent phosphoric acid, and sulphate of potash containing 50 per cent potash. In making a mixed fertilizer the ton is taken as the amount to be mixed. If more or less is needed the amount of the various materials will be changed accordingly. The following formula gives the amount of each material desired when the percentage of the desired element contained in the "simple" is introduced below the line and the per cent desired in the resulting mixture is introduced above the line and the solution will give the number of pounds required in a ton of the mixture.

$$\frac{2000 \times \text{percentage of plant food desired}}{\text{percentage of plant food in "simple"}} = \text{pounds of material required.}$$

Introducing the figures in the materials used and desired gives the following for the amount of ammonium sulfate required:

$$\frac{2000 \times 2}{18} = 222 \text{ pounds of ammonium sulfate.}$$

The amount of super phosphate is likewise determined:

$$\frac{2000 \times 12}{16} = 1500 \text{ pounds.}$$

If the treble super phosphate containing 45 per cent phosphoric acid were used we would have: $\frac{2000 \times 12}{45} = 533$ pounds.

The potash is also determined: $\frac{2000 \times 2}{50} = 80$ pounds.

Adding up the amounts found we have:

Ammonium sulfate	222 pounds
Super phosphate 16%	1500 pounds
Sulphate of potash	80 pounds
	1802 pounds
Filler	198 pounds
Total	2000 pounds

In case where super phosphate (45 per cent) is used we have:

Ammonium sulfate	222 pounds
Super phosphate	533 pounds
Sulphate of potash	80 pounds
	835 pounds
Filler	1165 pounds
Total	2000 pounds

The two examples illustrate the manner in which a high-grade fertilizer can be made by using the more concentrated materials. If the 45 per cent super phosphate were used it would be desirable to cut the filler to a minimum by using 165 pounds of filler

instead of 1165, which would give 1000 pounds of a fertilizer having a formula 4-24-4. An application of one half that required of the 2-12-2 mixture would contain the same amount of plant food. This same method can be followed regardless of the materials used. The important thing to know is the ratio of the different elements to be used for different crops and soils. Where this ratio is established it is immaterial whether the resulting product has a composition 1-4-1 or 4-16-4, provided the application is governed according to the actual amount of plant food applied per acre.

24. *What materials would be desirable to use as filler in Idaho?*

Dried ground peat is available in some districts and makes an excellent conditioner. The southern counties could use dried ground sheep manure to advantage. Where neither peat nor sheep manure is available gypsum or dry soil can be used. If fertilizers are mixed just before applying no filler is needed.

25. *Should all crops have the same type of fertilizer?*

No two crops make the same demand upon the soil for plant food. The legumes should not receive nitrogenous fertilizers unless it be at the time of seeding. Quick maturing crops such as vegetables require an abundance of plant food to secure best results. Slow maturing crops occupying the soil for the greater part of the growing season forage through the soil for plant food and do not require as heavy fertilization as quick maturing crops. Fertilizers are most profitable when applied to the crops used in the rotation according to their needs.

26. *Is it more profitable to use a complete fertilizer or apply only one element?*

This will depend entirely upon the amount of available plant food in the soil. The response of the crop to different fertilizers is the best way to determine the elemnts to use.

27. *How can the farmer determine the fertilizer needs of his soil?*

The most accurate results are obtained from field trials. The first work is best carried out with single elements. For example, super phosphate should be applied to one plot, nitrogen to the next, either as ammonium phosphate or a mixture of ammonium sulphate and super phosphate. To the third plot apply the same mixture of nitrogen and phosphorus plus potash. A check plot receiving no fertilizer should be placed on each side of the fertilized plots. In some cases a plot to which nitrogen alone is added is desirable. If the trails are to be made on alfalfa the nitrogen should be omitted. In order to determine definitely the profit obtained by the use of the fertilizers, accurate record of production should be obtained. Row crops may be handled by weighing the production from a measured length of a few rows; grain and hay crops by cutting measured areas. In some cases

the difference in growth is sufficient to estimate the effect of the fertilizers, but one never is sure until definite weights are obtained. An increase in production sufficient to be profitable does not in many cases produce a definite visual difference.

28. *What is the significance of a soil analysis?*

The soil analysis was formerly thought to serve as an index to the fertilizer needs of a soil. Difficulty in determining the availability of the plant food present has led to the development of a series of tests which indicate a lack of certain elements. These tests, while not always accurate, give sufficient information to warrant their use. The final test as to whether fertilizers will increase the profit in farming must be conducted in the field.

29. *Are commercial fertilizers injurious to the soil?*

The continued use of large amounts of sodium nitrate will produce an alkali condition in the soil. Heavy applications of ammonium sulphate will increase soil acidity, which is desirable in the soils containing excessive amounts of lime. The impression that commercial fertilizers are injurious has arisen because the continued use of fertilizers without providing a means of maintaining the organic matter in the soil results in an impaired physical condition. The use of fertilizer in a properly planned rotation will assist in maintaining the proper physical condition of the soil.

30. *Should the same types of fertilizers be used in Idaho as in the eastern states?*

The eastern states vary the formula of the fertilizer used according to the soil and crop. From the list used in the eastern states, formulae will be found to suit most conditions in Idaho. The eastern states use more potash than is needed on most Idaho soils. The soils of the eastern states usually are acid and fertilizers containing lime are very desirable. The irrigated soils of Idaho are well supplied with lime.

31. *How can fertilizers be used in a rotation most profitably?*

The legume is the foundation of rotation systems. Applying fertilizer to legume crops increases the amount of nitrogen and organic matter in the soil; thus decreasing, and in some cases eliminating, the need of nitrogen in fertilizers applied to subsequent crops. Apply fertilizer to the crops of highest value and depend upon crops requiring less plant food to use the residue left by the heavily fertilized crops.

32. *Are super phosphate and acid phosphate the same?*

The name acid phosphate was first used to distinguish between the natural rock phosphate and the same product treated with sulphuric acid to render the phosphorus available. The idea developed that acid phosphate contained free acid and rendered the soil acid. In order to remove this belief the manufacturers de-

cided to use the name super phosphate which had been used for years to describe the same product as the term acid phosphate. The sulphuric acid in super phosphate is combined with lime and super phosphate does not make the soil acid.

33. *Why is raw rock phosphate used in some states and not recommended for Idaho?*

Raw rock phosphate is the name applied to the natural occurring phosphate rock which has been ground for application to the soil. In the rock phosphate the phosphorus is combined with calcium (lime) and fluorine, making it insoluble. In order to become available to the plants, chemical changes must take place to change the combination of phosphorus and lime. Sulphuric acid is used for this purpose in preparing phosphous for fertilizer purposes. On acid soils rock phosphate is broken down and sometimes may become sufficiently available to make it a profitable fertilizer. On alkaline soils the rock phosphate decomposes too slowly to supply sufficient available phosphorus in one season to meet the needs of the crops. Soils extremely deficient in phosphorus will show some increase in production from an application of raw rock phosphate, but it never is possible to bring the yield to as high a point as with super phosphates. The higher production per acre gives a higher net profit per acre for the use of super phosphates.

34. *Will it be profitable to apply raw rock phosphate with manure to render it available to the plants?*

There is danger, where such trials are made that the effect of the manure may be confused with that of the rock phosphate. In order to definitely settle the point the farmer should make an application of manure without phosphate, adjacent to the plot receiving both manure and rock phosphate. A third plot receiving manure and super phosphate should be included to compare the value of raw rock with the value of super phosphates. Trials have shown that raw rock phosphate and manure will not equal super phosphate and manure in production or net profit per acre.

35. *How should the farmer regard the use of commercial fertilizers?*

Commercial fertilizers should be regarded as a supplementary source of plant food. In no case should fertilizers be used as a substitute for good farming methods. The purchase of fertilizers should be regarded as an investment which has proven profitable from previous trials.

36. *Are there any effects of fertilizers other than increasing the yield of crops?*

In some cases the improvement in the quality of crops increases the value of the product sufficiently to justify the use of fertilizers. Usually an increase in yield is accompanied by some increase in quality. Adequately fertilized crops mature earlier and are more resistant to frost as well as to plant diseases.

37. *Is there a fertilizer law in Idaho?*

The 1931 Legislature passed a fertilizer law; copies may be obtained from the Commissioner of Agriculture, Boise.

38. *In what way is the fertilizer law of benefit to the farmers?*

The fertilizer law requires that a statement of the plant food contained in commercial fertilizers be attached to the bag. The law provides penalties for misbranding. The law makes it possible for the purchaser to know the available plant foods and the amounts of each contained in any fertilizer offered for sale.

39. *Is the fertilizer law of benefit to the manufacturer?*

The fertilizer law protects the manufacturer from unscrupulous mixers who would misrepresent their product unless forced to state the contents and guarantee the analyses. The fertilizer laws were passed because dishonest practices had crept into the trade. The established fertilizer companies all favor selling their goods in states having fertilizer laws.

40. *Should the application of fertilizer be based on the analysis of plants grown on the soil?*

An analysis of the plant gives an index to the amount of plant food removed from the soil. This has been used by some as a basis for fertilizer recommendations. In using the analysis of the plant the assumption is made that it is necessary to add all the plant food used by the plant and that there is none in the soil which the plant can secure. The first use of fertilizers consists in adding a supplemental amount of plant food to bring about greater yields. If the analysis of the plant is used it is quite probable that applications will be greater than needed or elements will be added of which there is already a sufficiency in the soil.

41. *Can fertilizers be used to maintain a satisfactory and profitable agriculture without the use of live stock?*

It is possible to maintain the fertility of the soil through proper rotations and the use of fertilizers without live stock. Too many factors enter into the situation to say whether it is more profitable to pursue such a course. Most districts are specially suited to the production of some form of live stock and should continue with it as one of the farm enterprises. Fertilizers are not to be considered as a substitute for farm manures but as a supplement. The use of live stock and application of resulting manures conserves the initial fertility of the soil and reduces the amount of fertilizers needed to maintain production. If the amount of plant food needed for each crop is provided in a properly designed rotation no fear need be felt for the future productivity of the soil.

The following suggestions relative to the rate and method of applying fertilizers to various crops are made to aid in conducting farm trials.

The following materials can be satisfactorily used. Treble super phosphate, 45 per cent; ammonium phosphate, 13-52-0; ammonium sulphate, 20 per cent N; and potash salts containing approximately 50 per cent K_2O. These materials have been selected because of their greater use at present. If other carriers of plant food are used the application should be adjusted to give about the amounts indicated.

Alfalfa. Tests on alfalfa are most satisfactory when applied at time of seeding, working fertilizer into the soil. Applications to established stands are best made in the fall. Spring applications often show no effect until the second cutting and usually show a greater effect the second year. Basic application, 100 to 125 pounds of treble super phosphate. If potash is used it should be in addition to the basic application of phosphorus. Potash salts should be applied at the rate of 40 to 50 pounds per acre.

Beans. Beans have not proven as satisfactory a crop for first trials as alfalfa or sugar beets. Treble super phosphate 50 to 75 pounds per acre is the only type of fertilizer recommended for first trials.

Beets—Sugar. Phosphates have shown the greatest effect of any fertilizer used. Seventy-five pounds of treble super phosphate is recommended if applied with a fertilizer distributor on the drill, or 100 to 125 pounds per acre if applied broadcast before seeding. Potash has not produced increases above phosphorus in trials conducted. If potash is used it should be combined with phosphorus using it at the rate of 40 to 80 pounds of potash salts per acre. Nitrogen can be added to trials; either alone as ammonium sulphate, at the rate of 100 to 150 pounds per acre; or at this rate with the suggested applications of phosphorus and potash. Ammonium phosphate at the rate of 75 to 100 pounds per acre may be used with potash salts at the rate of 40 to 80 pounds per acre.

Corn. If a planter with a fertilizer distributor is available, apply treble super phosphate at rate of 40 to 50 pounds per acre at hill or in drill; if broadcast before planting, use 100 to 125 pounds per acre. Potash and nitrogen can be included similar to trials suggested for sugar beets.

Peas. Treatment is similar to broadcast application for corn. Use 100 pounds of treble super phosphate as basic application. Nitrogen should not be applied to the pea crop.

Potatoes. The potato crop requires the highest state of fertility of any of the general crops. The rates recommended for trails may be profitably increased on some soils. In order to test the effect of each element the application of phosphorus should be kept constant. The fertilizer should be applied at the time of planting, using

a basic application of 200 pounds per acre of treble super phosphate. Nitrogen and phosphate can be applied as ammonium phosphate (13-52-0) at the rate of 175 pounds per acre, or a combination of 115 pounds per acre of ammonium sulphate and 200 pounds per acre of treble super phosphate. Potash is best tested by adding at the rate of 80 pounds per acre to either of the combinations suggested for nitrogen and phosphorus.

In making trials as suggested small plots from a tenth to a fourth of an acre are sufficient. An accurate check of the yield and quality of the production on each plot is necessary if the full value of such trials is to be obtained.

Diagram showing set of plats to determine fertilizer requirements for potatoes. The same plan should be used for other crops using the rates indicated for each crop. Amounts indicated are per acre rates of application.

	Check
Phosphorus	Treble Super Phosphate Rate, 200 pounds
Phosphorus and Nitrogen	Ammonium Phosphate, rate 175 pounds or Ammonium Sulphate, rate 115 pounds and Treble Super Phosphate, rate 200 pounds
Complete Nitrogen Phosphorus Potash	Ammonium Phosphate, 175 pounds plus Potash salts, 80 pounds or Ammonium Sulphate, 115 pounds; Treble Super Phosphate, 200 pounds; and Potash salts, 80 pounds
	Check

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